THE IONISATION STRUCTURE OF IC 418

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Isophotal contour maps produced from monochromatic electronographic exposures of the low excitation planetary nebula IC 418 are interpreted in terms of a three-dimensional non-spherical gas distribution.

Comparisons are made with the ionisation structure models proposed by Flower (1969, Mon.Not.R.Astr.Soc., 146, 243) and Buerger (1973, Astrophys.J., 180, 817) and with the ionic distributions of Wilson and Aller which were derived assuming spherical symmetry (1951, Astrophys. J., 114, 421).

There is evidence from both contour maps and emission line profiles that the OIII distribution extends well towards the central star while the Hα contour map indicates that there is a central hole in the gas distribution or a dip in the emission measure for hydrogen in the inner regions of the envelope. (Paper to be submitted to Mon.Not.R.Astr.Soc.)

ELECTRON TEMPERATURE AND DENSITY MAPPING IN PLANETARY NEBULAE

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The linear response of the electronographic process provides a simple method for producing relative intensity ratios of emission lines across a complete nebula. Using narrow-band filters to isolate those lines which are sensitive to electron temperature and density changes, it is possible to map the gross variation of these quantities across the object.

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This technique has been used on several nebulae to produce temperature maps, using the [OIII] line ratios, and density maps, using the [SII] lines. (Paper to be submitted to Mon.Not.R.Astr.Soc.)

DISCUSSION

Osterbrock: Can you say quantitatively what is the discrimination of the λ6713 filter against λ6716 for instance, and of the λ4363 against HgI λ4358 (if it is a problem) and Hγ?
Worswick: The bandpasses of the 6713 Å and 6717 Å filters, which are double half wave interference filters, drop to the order of 1% of the peak transmission at about 7Å from the line. Contamination from the mercury emission line was fairly low at the Lowell Observatory site.
Aller: It would be extremely valuable to compare the electron temperature derived from [NII]λ5755 vs. 6584, and [OIII]λ4363 vs. 5007 on a point to point basis within the nebular images. We could then ascertain the scale of the temperature fluctuations from point to point.
Worswick: The project is feasible providing you have the correct filter, enough observing time and computer time.
Terzian: The maps you showed can now be compared with the radio synthesis maps and the projected distribution of the interstellar extinction can be derived.
Dopita: At Mt. Stromlo I have undertaken a program of absolute surface brightness measurements of planetaries using the SEC Vidicon photometer developed there along with the 74" Multi-Channel Scanner. These give contour maps of surface brightness directly with single frame signal to noise ratio better than 30. I have observed approximately 30 planetary nebulae in Hβ and [OIII].

THE ELECTRON TEMPERATURE IN THE He^{++} REGIONS IN PLANETARY NEBULAE

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A method of determination of the electron temperature in the He^{++} regions in planetary nebulae from observed intensities of [NeV] λ3426 and [NeIV] λ4714-25 relative to HeII λ4686 is presented. It has been used for 22 planetary nebulae for which the observational data have been taken from Kaler's Catalogue (Ap. J. Suppl., 31, 517). The electron temperatures in the He^{++} regions range from 15,000°K to 30,000°K

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